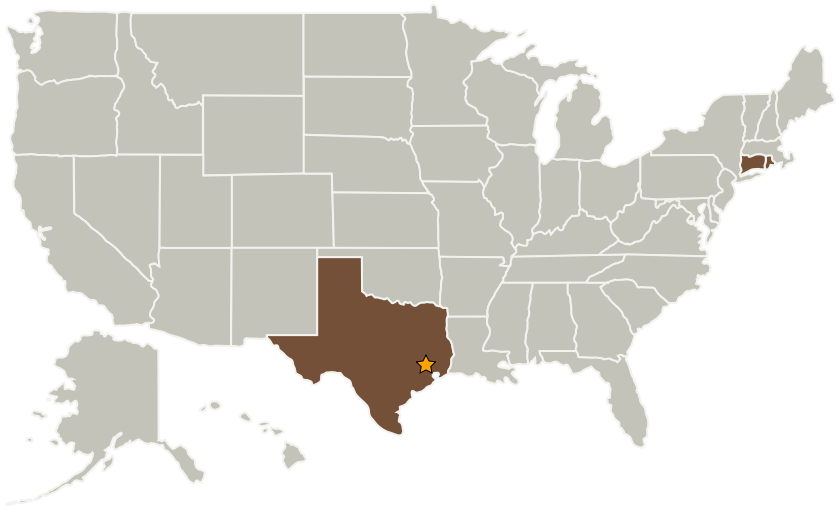
Nano-Engineered Materials for Rapid Rechargeable Space Rated Advanced Li-Ion Batteries, Phase II

Completed Technology Project (2008 - 2010)

Project Introduction

Lithium-ion (Li-ion) batteries are attractive candidates for use as power sources in aerospace applications because they have high specific energy, energy density and long cycle life. However, conventional Li-ion batteries experience loss of capacity and increased impedance and poor cycle life when they are charged/discharged at high rates over C-rate. These problems are magnified at low temperature operation. The limitations in the high rate capability of Li-ion batteries are mainly caused by slow solid-state diffusion of Li+ within the electrode materials Yardney/Lithion Inc., the world leader in cutting edge Li-ion battery technology proposes to investigate new non-toxic nano-engineered electrodes that significantly shortens the Li+ diffusion length within the electrode materials and increases the rate capability of Li-ion batteries. The goal of this Phase II project is to manufacture rapid recharge Li-ion battery for aerospace application. Yardney will manufacture 5 prototype cells capable of recharge at less than 15 min at room temperature. During the phase I we found that the nanoengineered anode showed excellent rate capabilities compared to planar electrode. Nanoarchitectured current collector provides higher safety due to large surface area contact with the active material and that acts as heat sink in high rate applications and also lower impedance.

Primary U.S. Work Locations and Key Partners



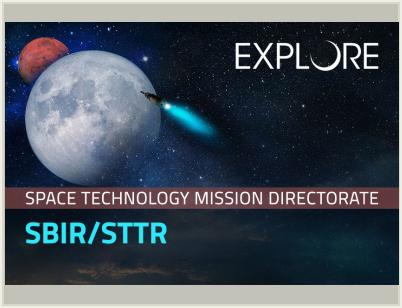


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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Yardney Technical Products, Inc.	Supporting Organization	Industry	East Greenwich, Rhode Island

Primary U.S. Work Locations	
Connecticut	Rhode Island
Texas	

Project Transitions

June 2008: Project Start

June 2010: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.2 Energy Storage
    - TX03.2.1 Electrochemical: Batteries